Service Design in practice: Case MaaS

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Abstract

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As thinking around sustainability grows, people see Mobility as a Service as one of the solutions to make cities a better place to live. This thesis explores MaaS, mainly the everyday users of it. It is based on the experiences of users of one of the world's first MaaS platform, Whim. Some of the users have almost two years of experience using it. To make the service scale and work even better in addressing user needs, it still needs more research work with actual end-user involvement - especially when the aim of the service is to provide an alternative to personal car ownership.

This thesis was made in cooperation with a company called MaaS Global. The Finnish company has developed the mobility service called Whim, where users can use one mobile application for their varying transportation needs. The company has operations in many countries, but this research focuses on users in Finland. The scope was to research users who are familiar with the Whim service and have used it. This work was done using semi-structured interviews with six users. The aim was to find people with different kinds of needs and usage. For example, some of them used only public transport or some of them had quit using the service.

Findings from the interviews were used in a workshop at MaaS Global. Data gave ideas on how to improve the Whim app and the service overall. Some were lower level things like app features and some findings were more conceptual such as new subscription packages. As MaaS is heavily reliant on 3rd party services, it was not surprising that there were also things that cannot be changed easily or at all. Findings also revealed some service elements that were overlooked but still affected the overall user experience a lot. As one of the deliverables, a new process and user journey templates was also made for collaborating with the users in the future. These were based on the user journey mapping made using mobility cards and drawings.

Keywords: service design, user experience, customer journey, mobility, public transport, startup, maas, mobility as a service

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Kestävän kehityksen ajattelun kasvaessa, ihmiset näkevät, että liikkuminen palveluna (Mobility as a Service) on yksi ratkaisu, jolla kaupungeista saa parempia paikkoja elää. Tämä lopputyö tutkii liikkumista palveluna ja erityisesti sen päivittäisiä käyttäjiä. Työ pohjautuu Whimin, yhden maailman ensimmäisistä MaasS-järjestelmistä, käyttäjien kokemuksiin. Joillakin käyttäjistä on kokemusta sovelluksesta melkein kahden vuoden ajalta. Jotta palvelua voisi laajentaa ja saada se vielä paremmin vastaamaan käyttäjien tarpeita, se tarvitsee vielä lisää tutkimustyötä oikeiden loppukäyttäjien kanssa. Etenkin, jos sen tarkoituksena on tarjota vaihtoehto omalle autolle.

Lopputyö tehtiin yhteistyössä MaaS Globalin kanssa. Tämä suomalainen yritys on kehittänyt palvelun nimeltä Whim, josta käyttäjät voivat löytää yhdestä mobiilisovelluksesta monia erilaisia liikkumispalveluita. Yritys toimii useissa eri maissa, mutta tässä lopputyössä keskityttiin Whim-käyttäjiin Suomessa. Tutkimusmenetelmänä käytettiin kuutta haastattelua. Tavoite oli löytää ihmisiä, joiden käyttö ja tarpeet olivat erilaisia. Esimerkiksi jotkin heistä käyttivät enemmän julkista liikennettä ja osa oli jo lopettanut palvelun käytön. Haastatteluissa käytettiin apuna liikkumiskortteja ja tehtiin omia käyttäjäpolkuja.

Tutkimustyön löydöksiä käytettiin työpajassa MaaS Globalissa. Löydetystä aineistosta saatiin ideoita siihen, miten Whim-applikaatiota ja koko palvelua voidaan parantaa. Jotkin löydökset olivat alemman tason löydöksiä kuten applikaation toiminallisuuksia ja osa enemmän konseptuaalisia, kuten millaisia uusia tilauspaketteja voisi olla. Koska liikkuminen palveluna on riippuvainen kolmannen osapuolen palveluista, ei ollut yllätys, että osa löydöksistä oli sellaisia, joiden muuttaminen ei ole helppoa tai edes mahdollista. Löydöksissä oli myös palvelun osia, joita oli ylenkatsottu, mutta ne vaikuttivat suuresti yleiseen käyttäjäkokemukseen. Yksi tutkimustyön tulos oli uusi prosessi käyttäjäpolun selvittämiseen ja siihen liittyvä työkalu. Tämä pohjautui haastatteluissa piirrettyihin käyttäjäpolkuihin.

Avainsanat: palvelumuotoilu, käyttäjäkokemus, palvelupolku, liikkuminen, julkinen liikenne, startup, maas, liikkuminen palveluna

Terminology

API

Application programming interface is a set of routines, protocols, and tools for building software applications.

Ecosystem

A complex network or interconnected system. In this thesis meaning mobility ecosystem.

Journey Planner

Feature inside the application where user can plan, compare and buy a trip.

KYC

Know Your Customer is the name for the process where company verifies the user's identity.

MaaS

Mobility as a Service means one stop place for your mobility needs.

Mobility

In this thesis mobility means all the means of transport. For example, it can mean walking or taking a bus.

Onboarding

When user starts the application or service for the first time.

PT

Public Transport.

TSP

Transport Service Provider means the company offering some mode of transport inside the service. For example a taxi company.

Table of contents

Abstract
Terminology

1 Introduction

1.2 Research question 2

1.3 Structure of the thesis 2

2 Literature review

2.1 What is MaaS? 3

2.2 Why is MaaS happening right now 4

2.3 Common misperceptions 5

2.4 How does MaaS work - what does it need to work 5

2.5 Example of MaaS: Whim application 5

3 Research and methodology

3.1 Interviewing Whim users 8

3.2 Motivation of use 8

3.3 User research 9

4 Results and data insights

4.1 First clustering 19

4.2 Second clustering 21

4.3 Third clustering 21

5 Conclusions

5.1 Reflecting to the findings 22

5.2 Limitations 23

6 Outcomes

6.1 Learnings 23

6.2 Next steps 24

References 26

Appendix 28

1 Introduction

I have been a designer in a company called MaaS Global Oy, where my title has been a Product Designer. MaaS Global is developing a service called Whim app and it is providing mobility as a service to its users. In the service users can choose a mobility mode based on their needs. Service has now public transport (bus, tram, train), taxis, bikes, e-scooters, rental cars and shared cars.

“Mobility is not social media. Mobility is physical structures and urban planning. It cannot be only one operator. It will be multiple companies. This also needs political leadership.” (Hietanen 2019)

For years the topic of Mobility as a Service has been more that how can it replace the privately-owned cars. This might be the case in the future but before we get there, there needs to be a lot of collaboration with the real users as the mobility as a service is heavily subscription based business model. Based on feedback from users and research work already done on mobility services, users are not always that price sensitive but still they don’t want to pay for services they use very rarely or at all. This makes sense and it is also a clear sign how important it is to work with potential users in every market area.

Service Economy is the biggest industry in the Western world (Wöfl 2005). At the same time the heavy industry has decreased. Because both of these things and other globalization trends the society we live in has changed a lot. One big thing affecting our daily lives is that more and more people move to urban areas. UN says that in the year 2018, 55% of the world's population was living in urban areas. Same number in 1950 was 30% and by 2050, it will be 68% (UN 2018).

In the same article UN also says that by 2030, the world is projected to have 43 megacities, most of them in developing regions. When it comes to city planning and living areas this is a big challenge and it does not help if everyone wants to own a private car. This is the same time a big opportunity for MaaS, it can even shape new cities. This is also what Karen Vancluysen from EUs Polis Network has pointed out (Vancluysen 2019). Ideally new cities would not be made for cars but for people is what Apaar Tuli, the Design Lead from MaaS Global LTD, says in his talk at Data Driven Design conference (Tuli 2018). In this way the talk about alternative mobility solutions is very relevant. There are also other problems related to cars than traffic and pollution. The fact is that cars are utilized only 4% of the time and the rest of the time those cars are mostly lying idle, occupying precious urban land (Bates, Leibling 2012). This also raises the prices of housing as there is less space in the cities - not only because there is limited space but also because in some places it is mandatory to build parking to new housing.

Main topic of this thesis will be the MaaS users and their motivations. It will investigate the real, everyday users and their motivations when it comes to mobility. Helsinki and the service called Whim has been the pioneers when it comes to running a long term MaaS platform. As the company has grown very fast, there have been signs that the service has become more business driven and it is lacking focus on the users. ISO 9241-210 is saying that the users should be involved in the process, preferably in many stages (ISO 9241-210). One reason why this is happening might be that it is hard to see the difference between a product and a service. In some ways the way of working has gone from user oriented to tech oriented. Looking at the Figure 1. this approach would go more into the Engineering box where there is a distinction between the goods and services.

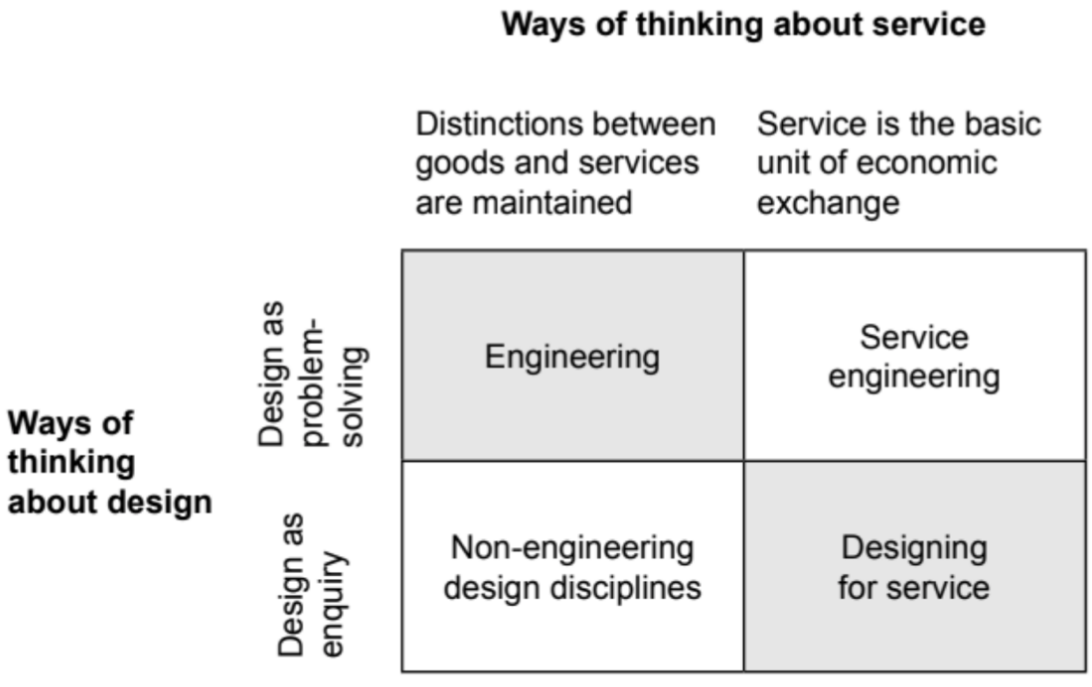

Figure 1. Kimbell (2011).

As we are talking about Mobility as a Service application the focus should stay in the user and keep in mind it is a service. Without this approach it is hard to develop a meaningful experience through a device (Hassenzahl 2013). There are products inside the Whim service; those are for example the different levels of subscriptions. Pay as you go, where user can buy individual train ticket or then user can select subscription for 30 days to use public transport. Also, those products include different kinds of services.

In the end the focus should stay on making a holistic service. Furthermore, it is good to remember that user always remembers the bad experiences longer than the good ones (Marano 2003). Reflecting on this also it is very important to involve the users more into the product development process (ISO 9241-210). Especially before releasing new products or even more important before opening in a totally new marketplace. Even inside one country the usage and habits might differ a lot.

Now we can start having user research with actual long-time users of MaaS, some are dating all the way from the beginning in 2017. This thesis aims to give a clearer idea of what kind of service the users want to have. This study will reveal some of the pain points users have, what do they like and what would they like to have. After this service can be improved and it will also give some new ideas for new subscription packages.

1.2 Research question

The research questions of this thesis is:
“What is the motivation of using MaaS service?”.

1.3 Structure of the thesis

The first chapter of this thesis will introduce the reader to MaaS. What is it, how does it work and what does it need to work? I will also present some important people and organizations. There will also be a general info about Whim application and how it works. After this there will be a third chapter which describes the methods of data gathering and the user research process. The fourth chapter will be revealing the results and will go true three approaches to clustering the data found. In the fifth chapter is about conclusions and reflecting on those. Last chapter is about outcomes and what should be the next steps.

2 Literature review

2.1 What is MaaS?

Short description from MaaS Alliance says: “Mobility as a Service is the integration of various forms of transport services into a single mobility service accessible on demand” (MaaS Alliance 2018).

If we go to details the Mobility as a service, or MaaS as shortened, means a service where end user has a variety of transport providers in one place. This includes public transport and private transport. Transportation modes can vary from bus to bike. MaaS service should also include other tools for user to conduct a trip. According to my own experience in my daily work and based on research these tools are planning, booking, access to real time info, payment and ticketing (Matyas, Kamargianni 2017).
One of the MaaS operators describes their service like this: “It seamlessly combines transport options from different providers, handling everything from travel planning to payments.” (MaaS Global).
In definition MaaS is a user-centric, intelligent mobility distribution model in which all mobility service providers’ offerings are aggregated by a sole mobility provider, the MaaS provider, and supplied to users through a single digital platform.

Biggest difference between other mobility services like taxi, ride hailing, or public transport is that MaaS is not working in silos. It also gets public and private transport closer to each other, thereby making the offering more useful and easier for the end users. Meaning that it gives the user a freedom to choose from a variety of providers and modes from one place, in Whim case an app, with seamless payment system. Figure 2 presents different kind of ecosystems, the first one being today the most common model. There is also model where the provider has many modes in its service, but it is not open for others. Some cities also want to have a model where public transport company runs the system.

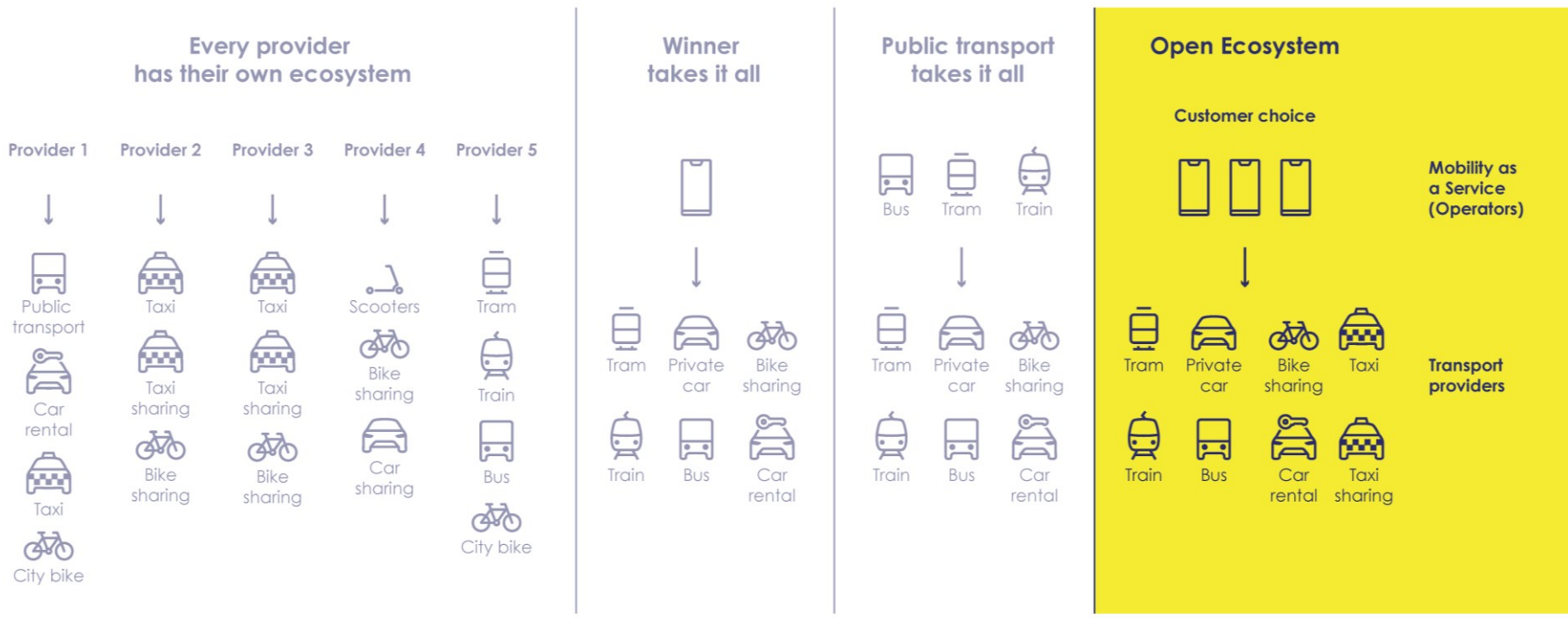

Figure 2. Different ecosystems. (Whimpact 2018).

This model is also closed. MaaS Alliance also adds these values to MaaS service: it should give user option to give up a personal car without compromising too much, it also should be more sustainable and even cheaper to use (MaaS Alliance 2018).

There is around +80 different MaaS project around the World, this includes running services and different kind of pilots. These services have a lot of variation when it comes to the offering (MaaS Alliance 2018).

Based on expert interviews and on my own experience the most important features in MaaS are: one service point, selection of modes and integrated payment. This would be the minimum level of the MaaS. Reality is that if the service only has one or two providers it would not make very good ecosystem. You could even argue if one operator or just few modes could

even be considered a MaaS system as user should always have the option to go freely to any place and compare prices. So, if there is only one provider offering bus tickets and other one is selling taxi service, the user would have very limited offering to choose from. In most cases this would mean it would not be flexible or cheap to the user. MaaS needs regulation and it needs political leadership. It has to be an open ecosystem; it cannot be winner takes it all model (Hietanen 2018).

So, if one key idea of MaaS is that it would replace the private car, it needs to have a variety of different modes and transport service providers so that the user can freely select based on their needs at that moment. Users reasoning to select one transport mode over another can vary between price, time, availability, duration or even sustainability.

After talking inside MaaS Global, I made a short list of some important MaaS ecosystem organizations and influencers around the World:

Maas Alliance

The Mobility as a Service (MaaS) Alliance is a public-private partnership creating the foundations for a common approach to MaaS.The main goal is to facilitate a single, open market and full deployment of MaaS services.

Finnish Ministry of Transport and Communications

The Finnish Ministry of Transport and Communications has had a substantial role in spearheading the development of policy and regulatory frameworks for MaaS. The ministry started laying the foundations for its work on MaaS back in late 2000's. The Finnish Ministry introduced the first phase of the so-called Transport Code (Act on Transport Services) in 2018, as the first MaaS enabled regulative framework in the world.

Catherine Kargas

20 years of experience helping mobility companies with sustainable mobility.
"For me, it's not just MaaS — it's electric MaaS".
(Skedgo 2019)

Tim Papandreou

Timothy Papandreou is a strategic advisor to companies and governments on mobility trends. "I dream of cities where it's easy and fun to walk, cycle and ride in a variety of vehicles autonomous, electric and, above all, shared"
(Movin'On 2018)

Sampo Hietanen

The father of MaaS and co-founder of the MaaS Global LTD. Has also toured all around the World to talk about MaaS, how it works and what it needs to get it working. "This not only requires getting out of silos but also a complete change of mindset in order to consider their service as part of the end user's needs rather than as running a bus, train or taxi service…"
(ITS International 2016)

2.2 Why is MaaS happening right now

ICT and tech are one of the big enablers in the MaaS scene. Nowadays almost everyone has a mobile phone with some kind of internet connection. In Finland 2017, every three out of four people between the age of 16–89, owned a mobile phone (the main user interface for MaaS) with 3G or 4G internet (Tilastokeskus 2017). Different kind of APIs make lot of services more accessible. Of course, without access to the API it makes no difference. One of the megatrends is hyper urbanization. It means that 1.5 million people are added to the global urban population every week (Pwc 2016). Other megatrends affecting the mobility system now are climate change, demographic and societal changes (Kamargianni 2017).

2.3 Common misperceptions

MaaS is not only offering subscription based products. MaaS service can be very flexible for user when it comes to usage time of for example public transport. Users can also buy one-time use products like bus tickets. The time on those tickets can vary between minutes to days, some markets even a year. Users can also rent for example a car or a bike for x-amount of time. These modes and offerings can vary a lot even between different countries. It is more related to the fact how much for example city has but money to the public transport system or how is the city infrastructure made. Also, many laws can slow down or even stop the process of having a MaaS service live. Like said usually the offering changes based on city, but there can even be international connections like trains. This is common in European as there are operators working in many different countries. For example, like the NS International which is a rail operator in the Netherlands, but it also operates to Belgium, France, Germany and Switzerland (NS International).

Any service without any integration outside of it own service is not really a MaaS service, it is then its own silo. Like talked earlier the service should also have more than two modes to fulfill the needs of the users. Services like ride-hailing apps are often mistakenly referred to as a MaaS platform even that most of those are working in silos and don't offer users a real freedom of mobility when it comes to offering. Also, if it is promoting only car-based modes with private trips it is not very sustainable either.

2.4 How does MaaS work - what does it need to work

As I interviewed Krista Huhtala-Jenks she raised these three things: "There are three basic elements that are needed for a MaaS offering to be built in a given market. These are 1) adequate number of transport service providers, 2) these transport service providers to have the technical capabilities, aka open APIs with the necessary functionalities, to be fully integrated for a seamless digital user experience, and 3) the willingness of all partners to cooperate" (Huhtala-Jenks 2019).

Mobility as a Service needs to have a public transport in its offering. Like Sampo Hietanen has said, public transport works like a backbone for the whole service (Hietanen 2019).
Like earlier pointed out for MaaS to really compete with private car ownership the service offering needs to have a multitude of different mobility services. It should also have substitute for car in that way that there are a short and long-term replacements. This means taxis, car-rentals and car-sharing. For short quick trips there should be a micro mobility offering like shared bikes or scooters. All of this needs to have open APIs to work. Those APIs also need to include necessary functionalities for making a trip like booking and payment. From the application users should be also apple to show a ticket or for example open car doors.

2.5 Example of MaaS: Whim application

Whim is a mobile phone application for iOS and Android users. It is free to download and after giving payment details user can right away buy trips. The main function of it is to sell mobility services to the users. This can mean single trip, monthly subscription, car rental or using micro mobility services like bikes. Whim also includes the function for paying the trips without leaving the application.

The application has supporting functions for every day mobility needs like Timetables, Journey Planning and Map view (Figure 3). If user has a monthly ticket, they can just onboard public transport. In some modes it is not even needed to show the active ticket before the inspector comes. Many times, it is not needed. In some of the modes you have to show the active ticket to the driver before you get in. Some other countries there is QR scanners at the gates where user can show the ticket.

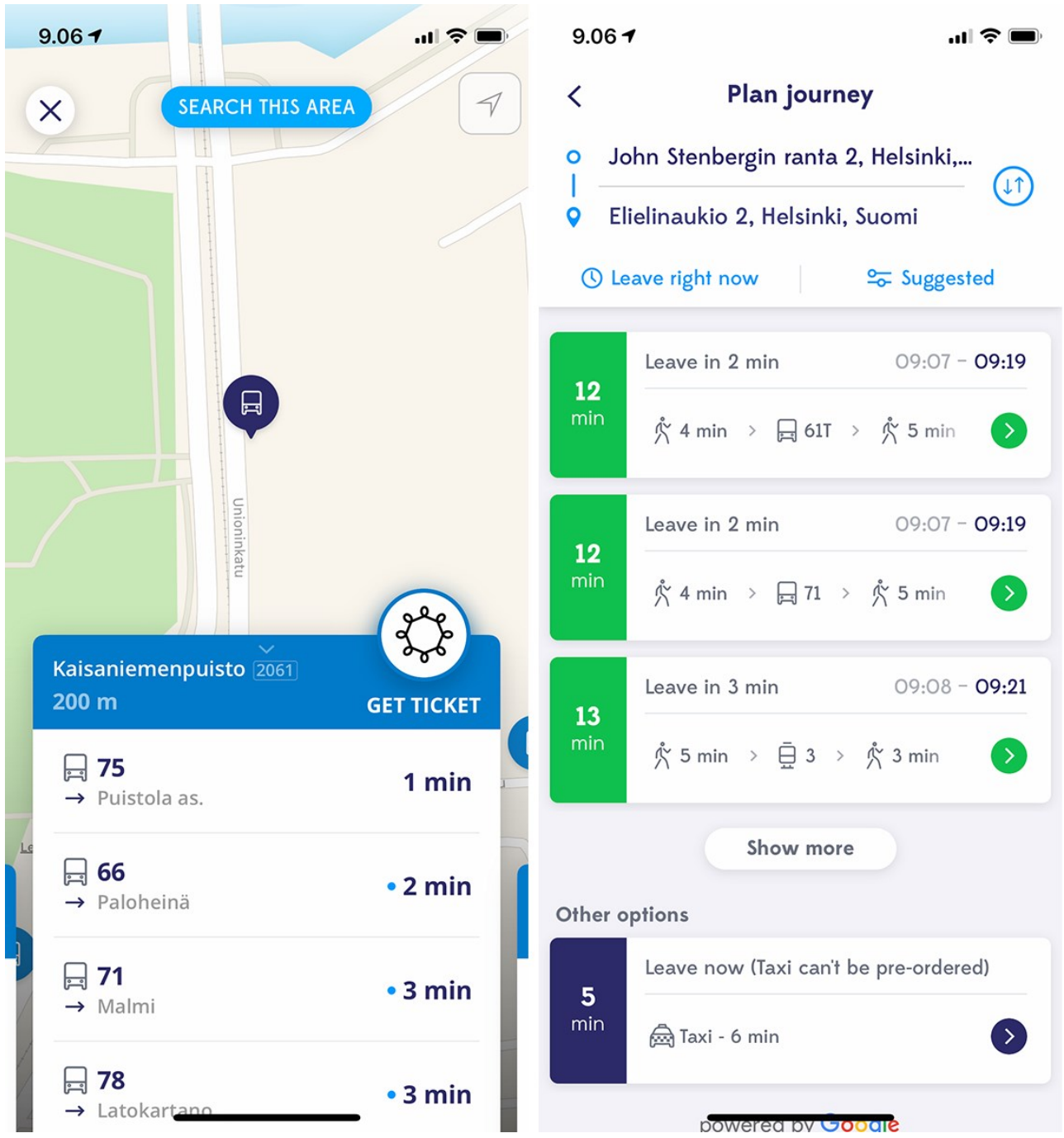

Figure 3. Whim timetables and journey planner.

There are different products inside the app to choose from based on the mobility needs, these are the different kind of plans (Figure 4). Some people only use it to buy single tickets as they might have their own bike, or some might only use public transport with monthly subscription. The packages have some variation in the offering to full fill the different needs. For example, the Weekend package gives user access to rental cars for every weekend. Urban package aims to fill the needs of commuters. Micro mobility and taxis with discount are also included to the monthly plans.

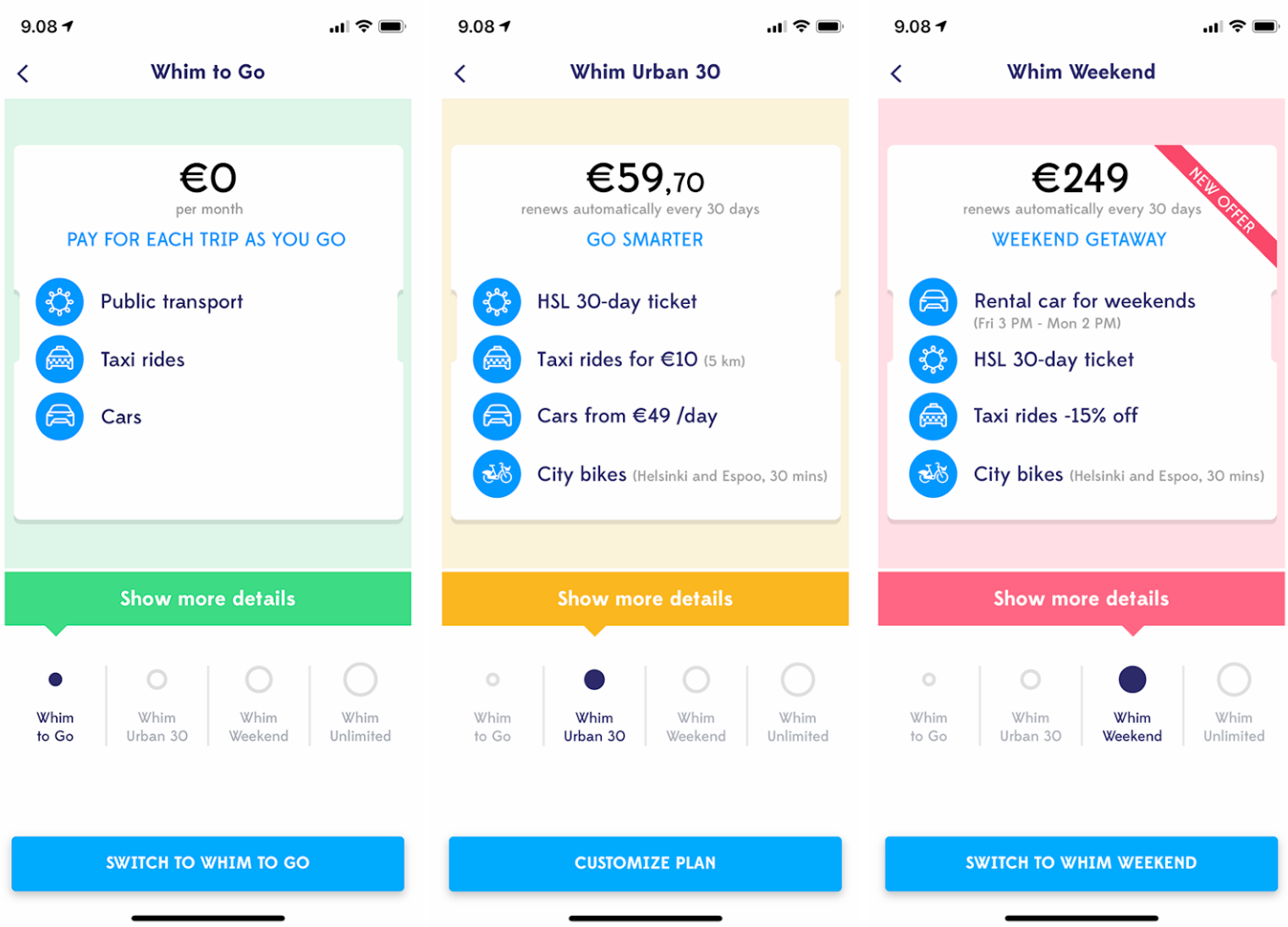

Figure 4. Whim subscription plans.

Whim users made 2,15 public transport trips per day (Whimpact 2018). It might be small surprise that Whim has users in many age groups even that it is application-based service (Figure 5). Now that there is no student tickets in Whim it effects to these statics. It might make the young adults the biggest user group inside the Whim. Whim users are very multimodal. Based on Whimpact study 42% Citybike trips were combined with public transport. Whim users also combined taxi to public transport three times more than average users in Helsinki.

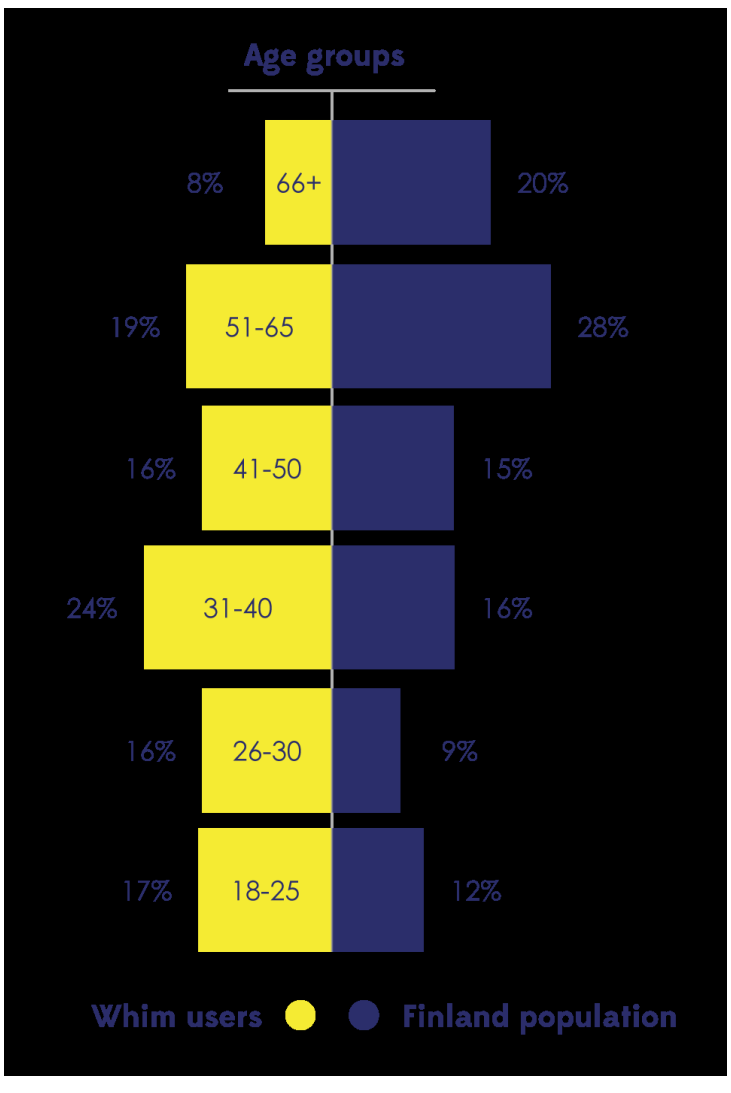

Figure 5. Picture name. (Whimpact 2018).

3 Research and methodology

3.1 Interviewing Whim users

In this thesis the main method used was one to one qualitative method but also participatory design methods. As the research question was about motivation, I felt these methods would get me the most insights. There was clear idea to use only people with experience of Whim. So, in that way the interviews were between unstructured and Individual in-depth interviews (DiCicco-Bloom, Crabtree, 2006). There was direct questions but also drawing and card sorting. These interviews were done in the company's premises.

As interviews can be very static when it comes to the setting and feeling, there was also an idea to use more activating methods were people would get more relaxed. And as people would get more relaxed, they would talk more openly and share more insights when there are no direct questions to think about.

Because of this the interviews were split into two parts where the first half was semi-structured interview and second half was drawing a user journey and sorting mobility cards. In the user journey the interviewee was asked to describe their average day of mobility. After that the interviewees were asked to place mobility cards on the timeline to get insight and experiences of different touch points along the way.

As the second half was somewhat experimental, it was developed and tweaked after every interview. Finally, after all the interviews, there was more structured way of doing the user journey and using the mobility cards. This same process and tool could be used later in other projects. This could mean for example cases when the company is entering a new area.

After the first interview, it was clear that the process and interview questions needed some adjusting. It was after the first interview when I decided to also use the mobility cards in the interview process.

3.2 Motivation of use

User experience design in MaaS can be very complex when you start mapping out all of the user journeys in it. It is not enough that user just downloads the app and starts using it. For example, inside the Whim app user might need to go through a Know Your Customer flow, where the service provider like car rental company will ask you to identify yourself. Reason can be legislation from that country or city, insurance company or fraud prevention. But the fact is that the users don’t care who is asking and what. In the end it is the service they are using that they think is the one asking them to provide documents like KYC, saying there is a restriction to this service or making them to add date of birth to their profile. In this case it is the Whim application and the experience they get out from it.

Because of these complex parts of the service it is really important that the day to day use if very fluent and easy. Also, the research question was “What is the motivation of using MaaS?”. With complex service and lots of moving parts people, including designers, tend to underestimate variability when they make judgements based on uncertain data and believe that others are more similar to them than they actually are (Tversky, Kahneman, 1974). In our service we have already seen this happening in some levels. It can be as small as button size or color.

Now that the Whim application is coming to a point where the old design and usability feels in some parts outdated and there is lots of new modes, it also needs a lot of user research work. Main goal from this user research is to map the needs and possible pain points people have now. Then later take them into account when designing new products, user flows and user interfaces. As the main research question was: What is the motivation of using MaaS? Like Maslov says motivation is related to needs. Inside the needs there is a different kind of levels. One of the high-level needs in Maslow's hierarchy of needs is physiological, this includes basic things like food and clothing (Maslow 1954). It is important to keep in mind that

user experience goes beyond just user interface. Nielsen Norman Group says user experience includes “all aspects of the end- user’s interaction with the company, its services, and its products (Norman, Nielsen). Nielsen Norman Group has also made model of the construction of the UX (Figure 6). From internet you can find many variations of user experience values, but mostly it is just variations between phrasing and what is the end use.

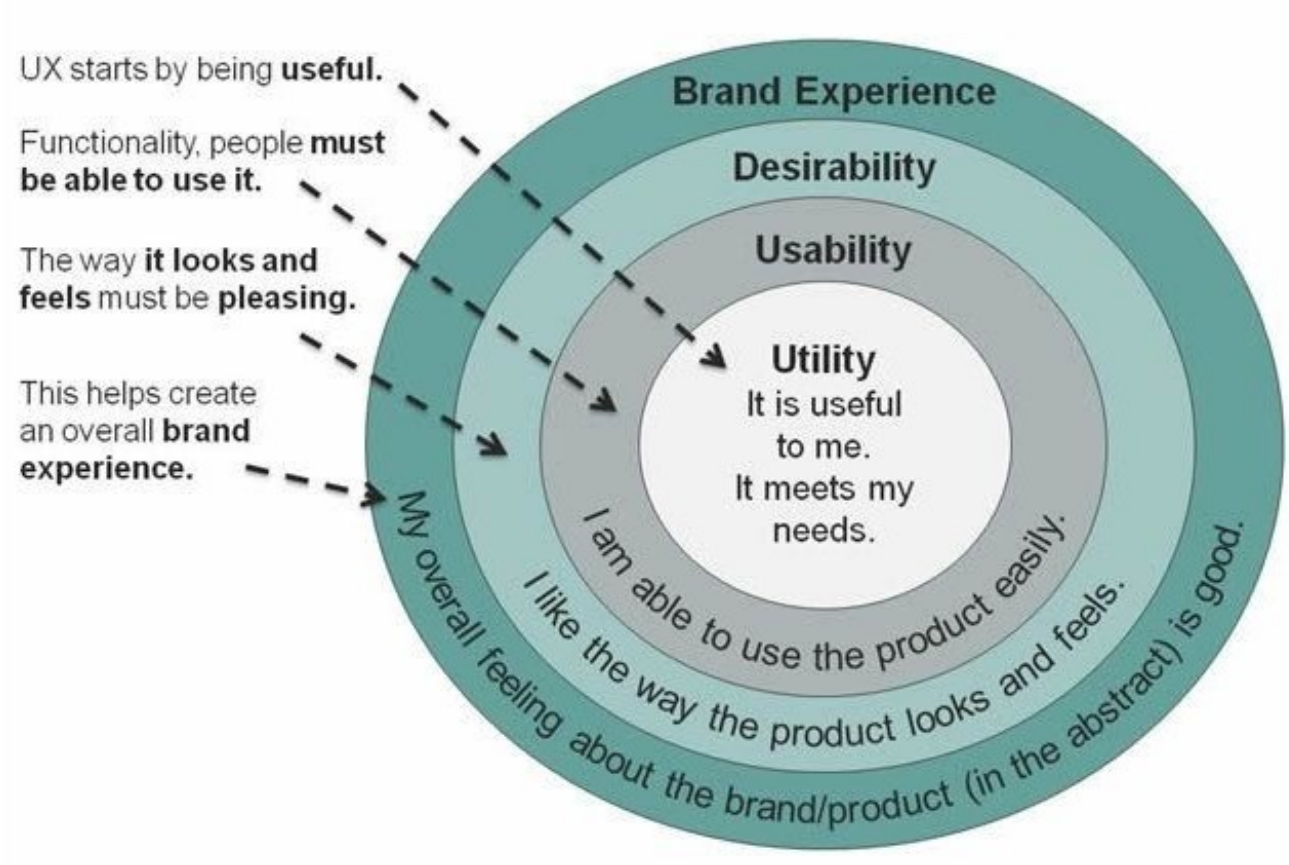

Figure 6. Construction of UX. (Nielsen Norman Group, 2008).

3.3 User research

As the main research method was user interviews it was important to have an idea how to select the interviewees and not just pick them randomly. This would guarantee that the data is rich and address the research question (DiCicco-Bloom, Crabtree, 2006).
First criteria for selecting the interviewees was that they are users or have been users of Whim application. Like previously said idea was not to target new potential users but study existing users and their experiences as they have used the service. This also made the scope of the interviews more focused and questions had more real-life context. Interviewees were recruited from social network and company contacts. No long-term employees were used in the interviews, one of the persons had started in the company at the same week.

Second criteria was that all of them are commuters and use public transport. One of the interviewees was user who was not using Whim anymore. I also did not want to have heavy car users as then the insight from the Whim application, public transport and micromobility usage might be very low. In that way the interviews would be waste of time.

Third lose criteria was that all of them would have at least slightly different usage and needs when it comes to commuting.

Recruitment of interviewees was successful in that way that there was a good variety of backgrounds. There was a person with Weekend package, one person used a lot of taxis, personal bike user, metro user and most of them were multimodal users. This gave me lots of different experiences related to public transport, using the Whim app and even from multimodality. Interviews also gave some ideas for new services inside the app as we saw some behavior patterns. Of course, as the service in the end is provided by many different companies, there were things we cannot control at all. Things like dirty Citybikes, angry bus drivers or weather. Still some of the things, even that you cannot really change them, you can help the user to even out those experiences.

Participants

Age distribution of the participants was from 24 to 37 years. That is also the biggest user group in Whim. All of the interviewees had little bit of different background and needs when it comes to mobility.

The first interviewee had a personal bike and only used public transport at wintertime and when there was bad weather.

There was a single parent who was using public transport everyday but was also heavy taxi user. She also liked to use Citybikes. In that way also a very good example of multimodal user.

One of the participants was living near a metro but also sometimes used a bus. She also had taken the Weekend package where you can also use a rental car every weekend.

Rest of them were using lots of public transport but had some variations on the usage. Some used more train, one was using micromobility during the working day. Only one of them had a personal car and it was only used at weekend time. She was not driving the car at all.

User interviews

There were in total 6 qualitative interviews and all of them lasted from one hour to one and a half hours. This also included making the user journey of average weekly mobility and using the mobility cards describing the pain points and experience of the different touchpoints. All but one interview was done on the company premises as there was big tables and quiet meeting rooms. I offered the possibility to have the meeting in some other location, but our office was always chosen for the meeting place. The interview started in the way that I asked from the interviewees permission to record the interview. The interviews were recorded and photographed. I also pointed to everyone that it will be anonymous.

Interview had nine main questions and some of those questions had supporting questions. In total there were 19 questions. Idea was that if every question would take around five minutes the interview part would be around one hour. After the first interview I started asking more improvised questions to get more data. I was also trying to follow also the basic interview technique of The Five Whys to get the root causes of experience (Stickdorn, Schneider, 2017). Sometimes the participant started talking

In the first interview I did not use the mobility cards at all and I felt like I did not get enough insights. After the first interview I talked with the team and supervisors. It was clear the process needed something more, not just from the interview part but also from this user journey part.

User journey with mobility cards

After the basic interview part every interviewee was asked to draw their average day as a timeline. This process evolved after every interview. There was always some point what to improve. One thing learned was that even though it sounds like it would be easy to just draw a line and write something, some people felt a lot of pressure from it. Idea behind this phase of the interview was to get a better understanding of the experiences with different touch points. Making it more active and visual people would share more of those small details they might think are not important. In overall journey maps provide a high-level overview of the user experiences from user's perspective (Stickdorn, Schneider, (2017).

The mobility cards used were created in 2017 by Apaar Tuli, it is a design toolkit to develop empathy for people's mobility needs. These cards have also been used with TSPs in workshops at MaaS Global. Before I used them, I wanted to add some new ones. Before using the mobility cards, I took out all cards related to cars as I did not see them relevant. There was cards like parking and refuel. As reference for new cards I also used Travel problems taxonomy (Maghraoui, 2019). During the interviews every interviewee made one or more new card and that way contributing to the mobility card set (Figure 7)

Figure 7. New mobility cards from interviews.

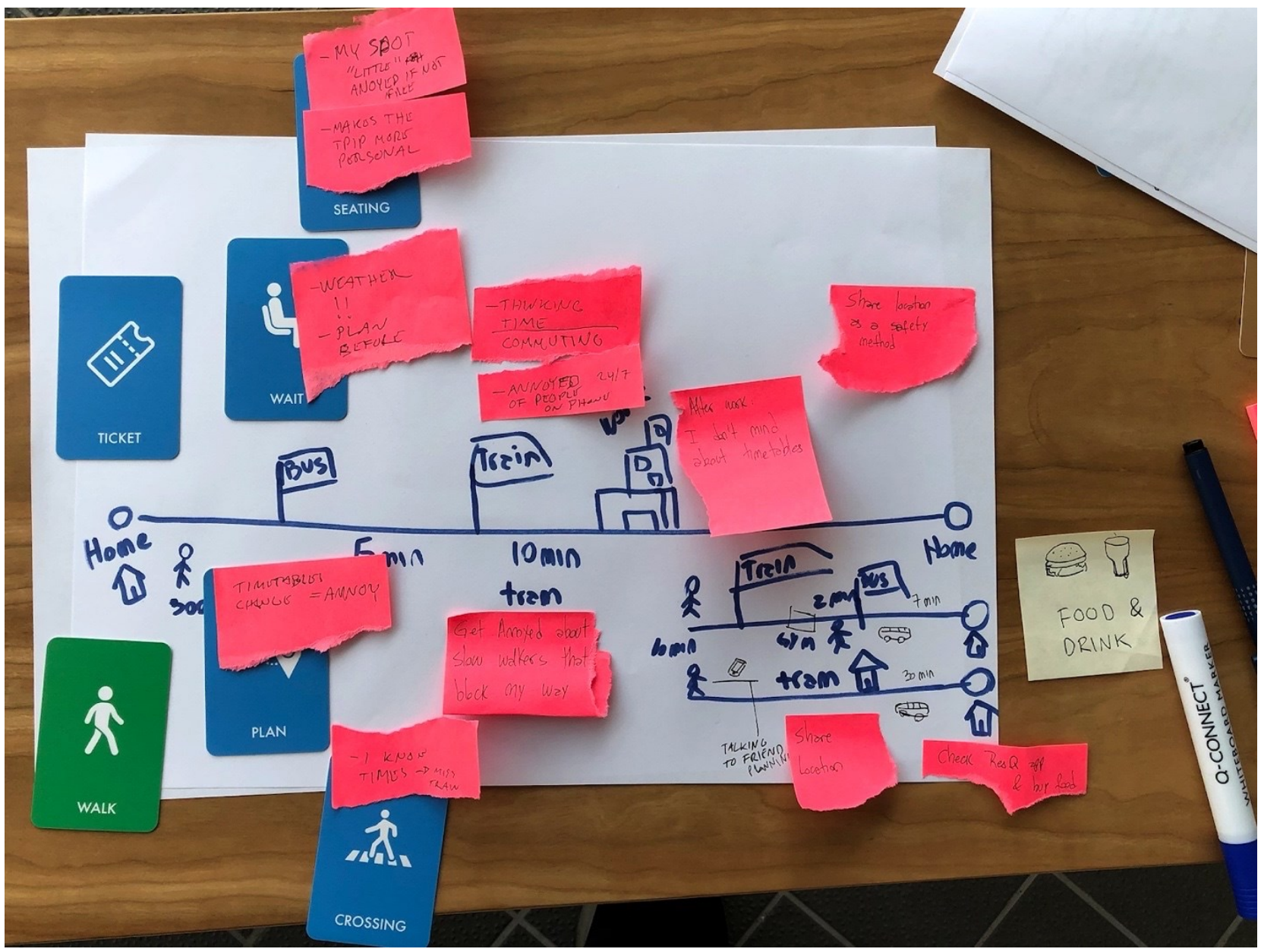

Figure 8. Mapping the user journey.

As seen on the Figure 8, the paper did not have enough space for drawing and using the mobility cards. Like said the first interview only had the timeline with touchpoints user had in their daily mobility.

For some it was also difficult to estimate how much space to use and where to write things. This was clearly an area for improvement. Then the guidance and thinking of the drawing took some time and focus from the main activity. After these learning it was clear this method would need firstly more space and also more adjusting.

Between interviews there was some iteration happening with the user journey tool and process. But it wasn't until the last two interviews where I started thinking that maybe this could be more than just a light exercise for my thesis. At this point I had a pretty good idea what was needed. I also wanted the template to be easy to understand, trying to think how someone could use it without any guidance.

I started the work very hands on style, just seeing how much space the cards would take. I reflected the need for space (Figure 9) to the previous interviews and also was already trying to think how to make it more advanced. At this point I did not want to change the process too much as I already had lots of data from previous interviews.

Figure 9. Testing the spacing.

The first version was basically a drawing to paper with two A3 papers taped together for longer timeline and to have more space for the cards (Figure 10).

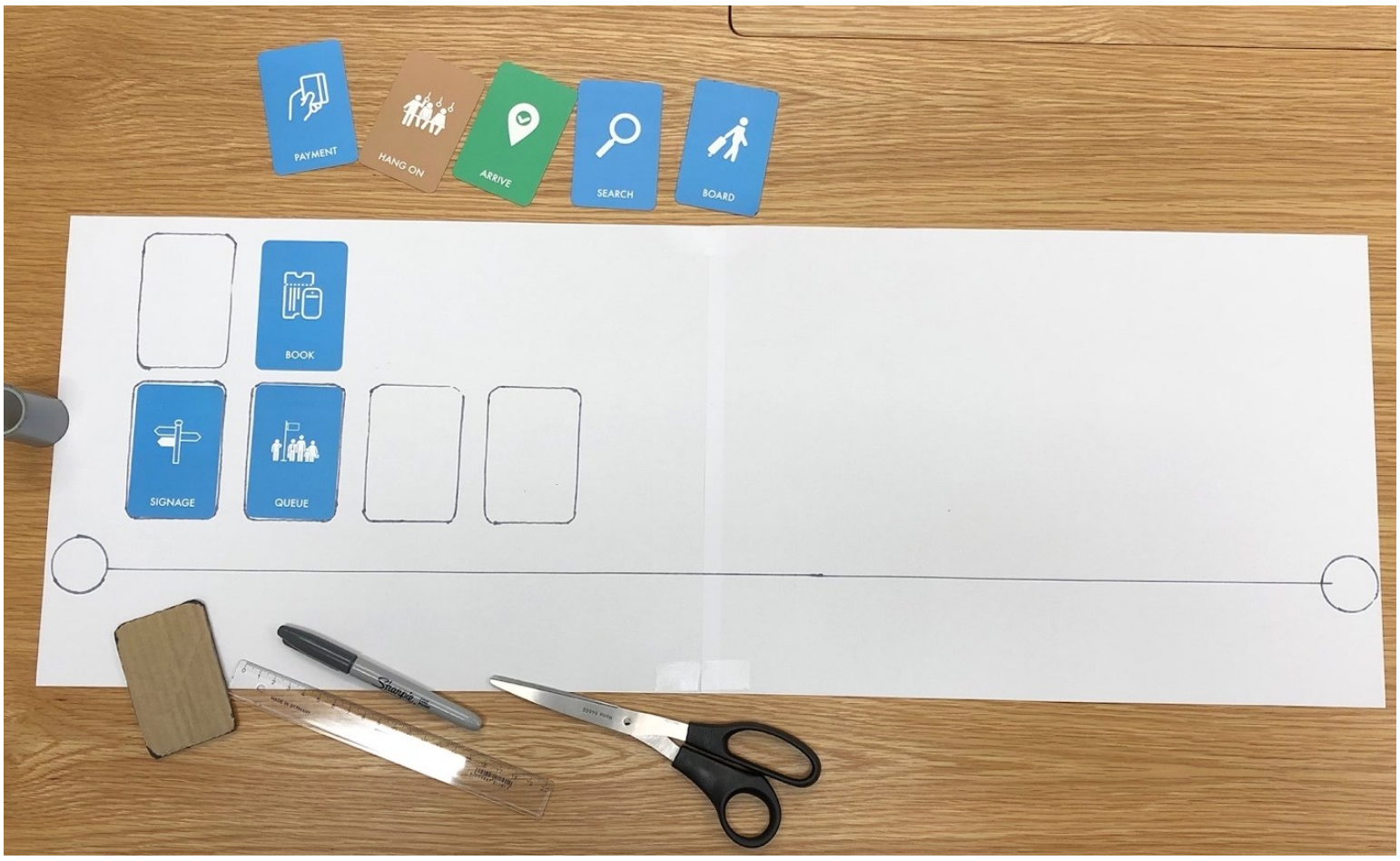

Figure 10. More space for the cards.

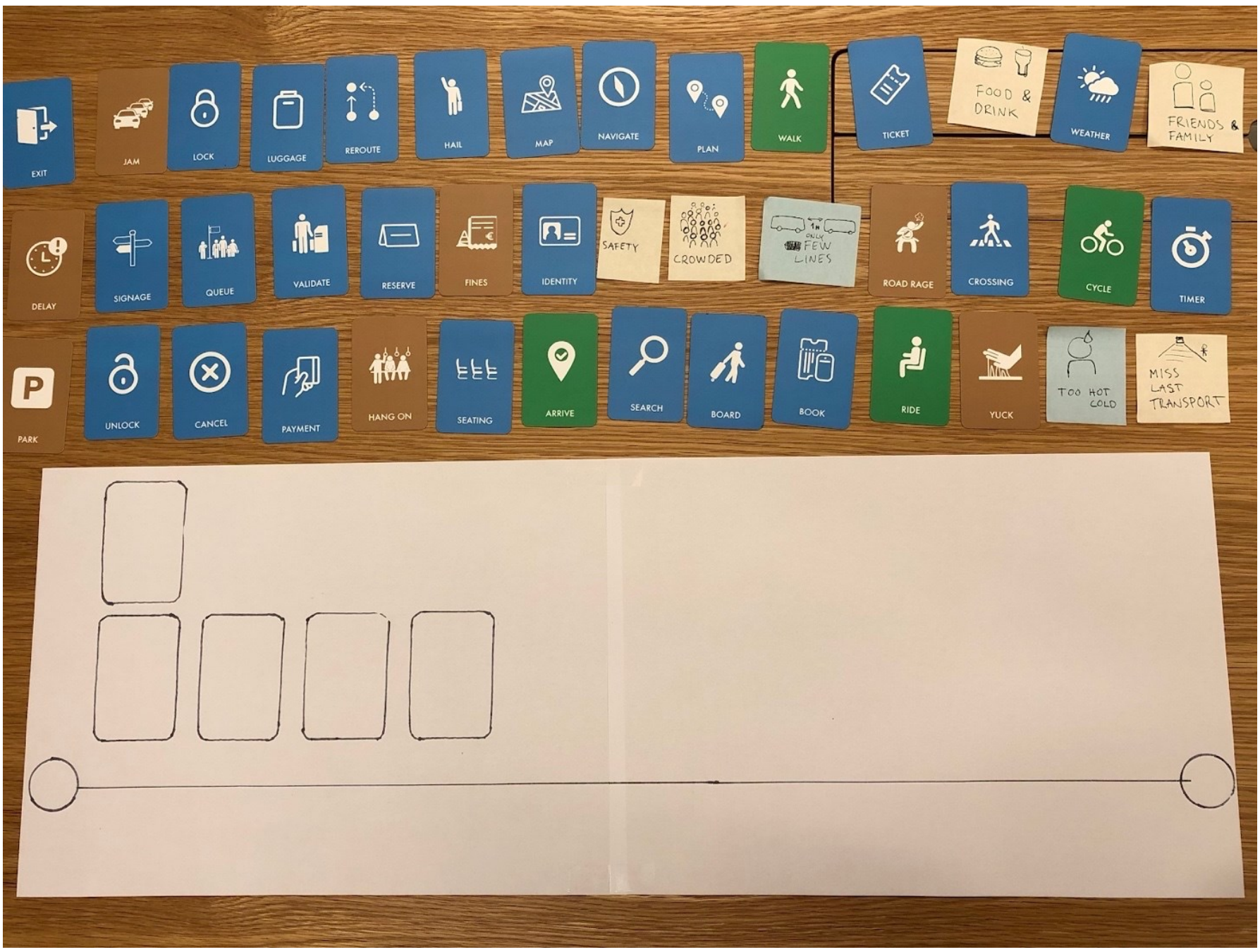

Figure 11. Template ready.

The template made the process and filling it clearer for the interviewees. This minimized the confusion around it (Figure 11) and it was easier to approach. On the second to last interview it was already more writing than drawing as there was a template with timeline. Like earlier the timeline started with an empty circle where the interviewee wrote the starting point of the journey. All of the interviewees had a regular job so most of the timelines were about commuting or social activities. Depending on the user there was a lot of variation on how much they moved during the day. The template was tricky to fill in that way that some parts of the trips have more touch points than others (Figure 12).

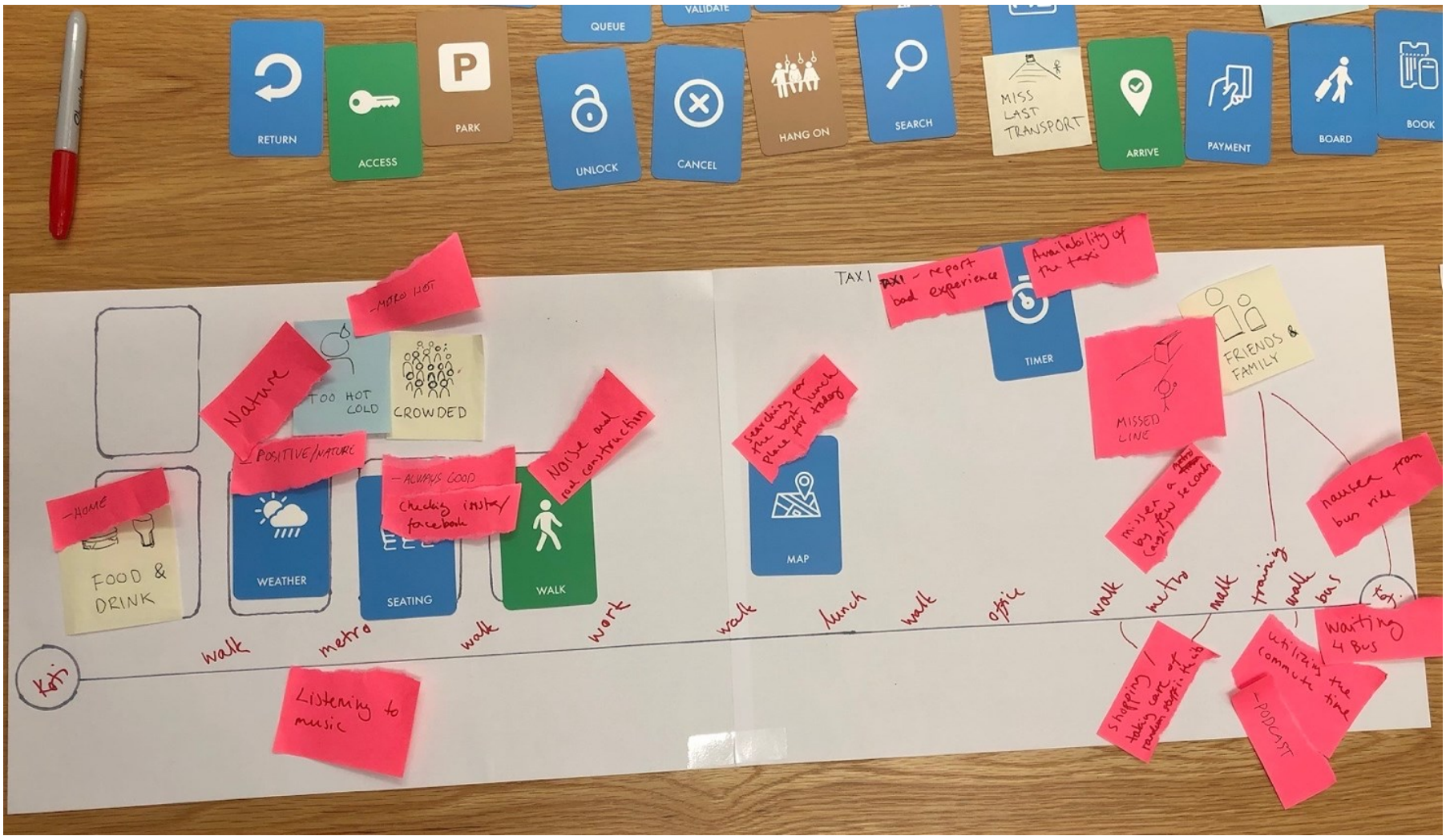

Figure 12. Template after the interview.

Usually the start and end had more feelings and thoughts from the users. This meant that there was also more cards and less free space. Before the last interview the template was made into a digital form (Figure 13).

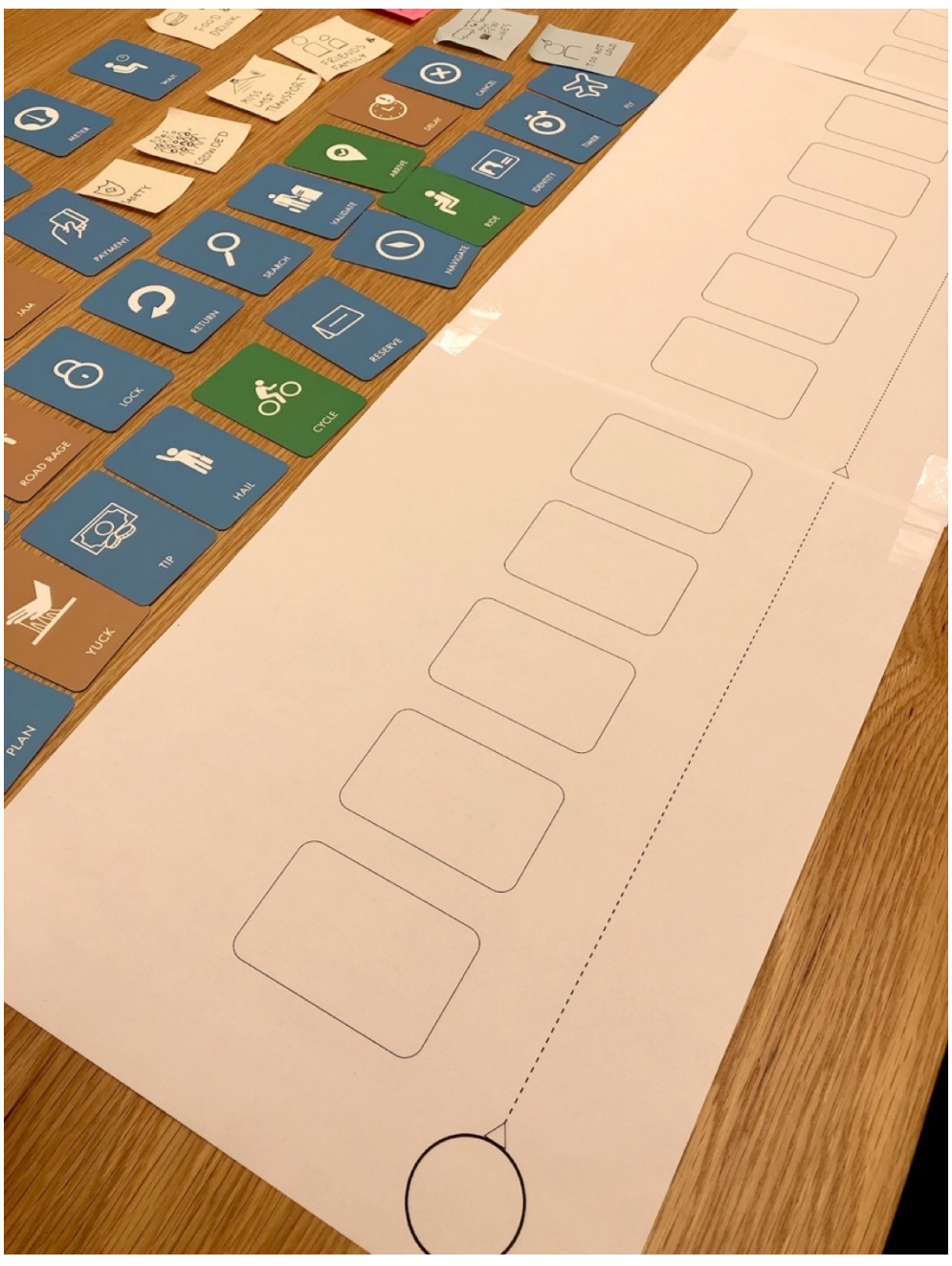

Figure 13. Printed template.

It was clear that the template still needs adjusting but it has already made the process easier for the interviewee. Also, for documenting it was now easier to get a better picture of the whole user journey and share the insights (Figure 14).

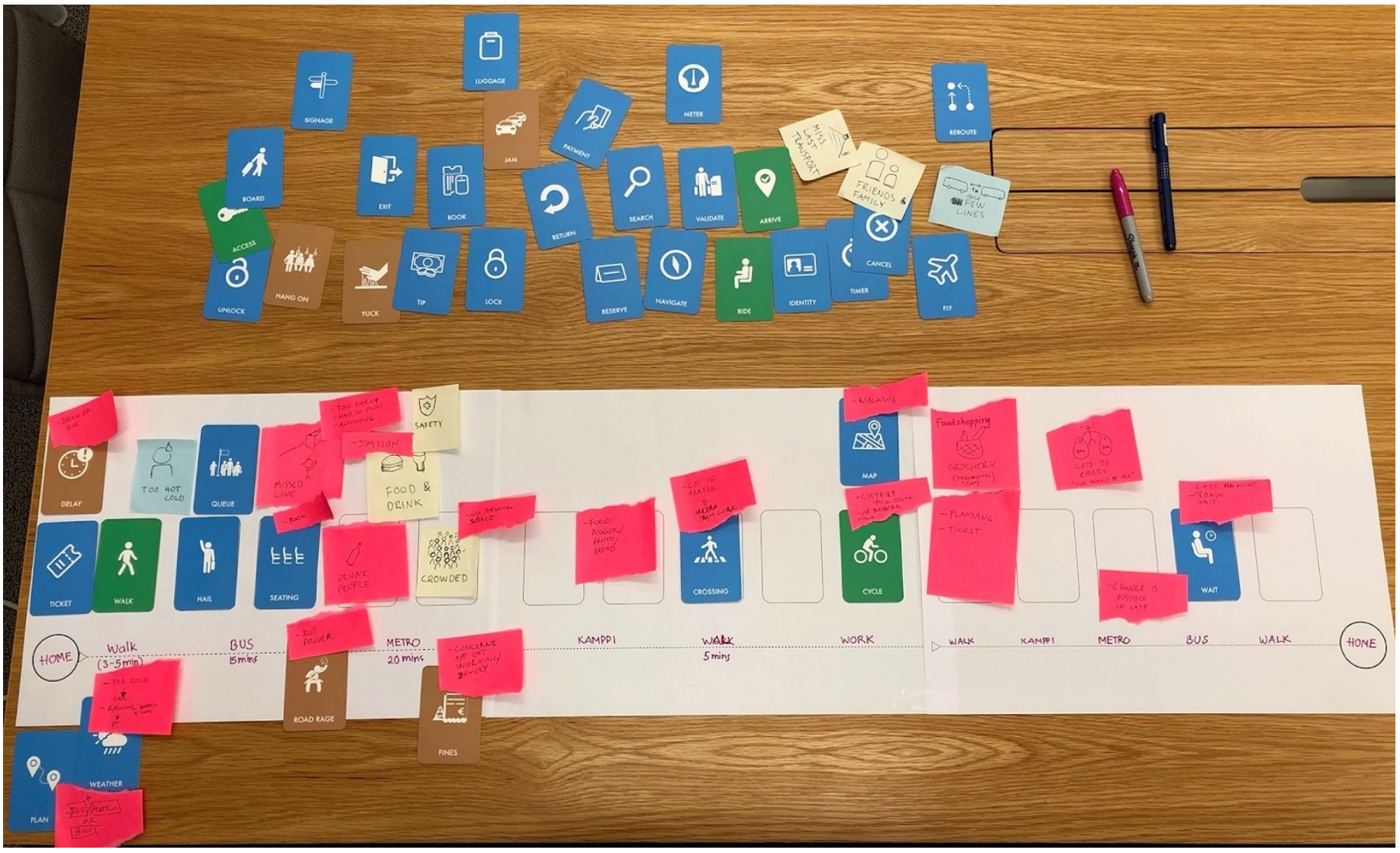

Figure 14. It was easier to document the process.

Affinity mapping

After the six interviews there was a lot of data, some more relevant than others. This was the reason to use affinity mapping as there was a large amount of unstructured qualitative data (Lucero, 2015). I listened to all of the interview recordings. This meant almost one working day of listening and writing notes. The idea behind this was to remember again what was told and see if something was missed during the one to one interviews. As I was the only one recording the interviews it was sure I missed some of the data. I also had an idea that other people in the company (Figure 15) could use the breakdowns to easily get insights. Also, this way they can see what the relevant details for them might be.

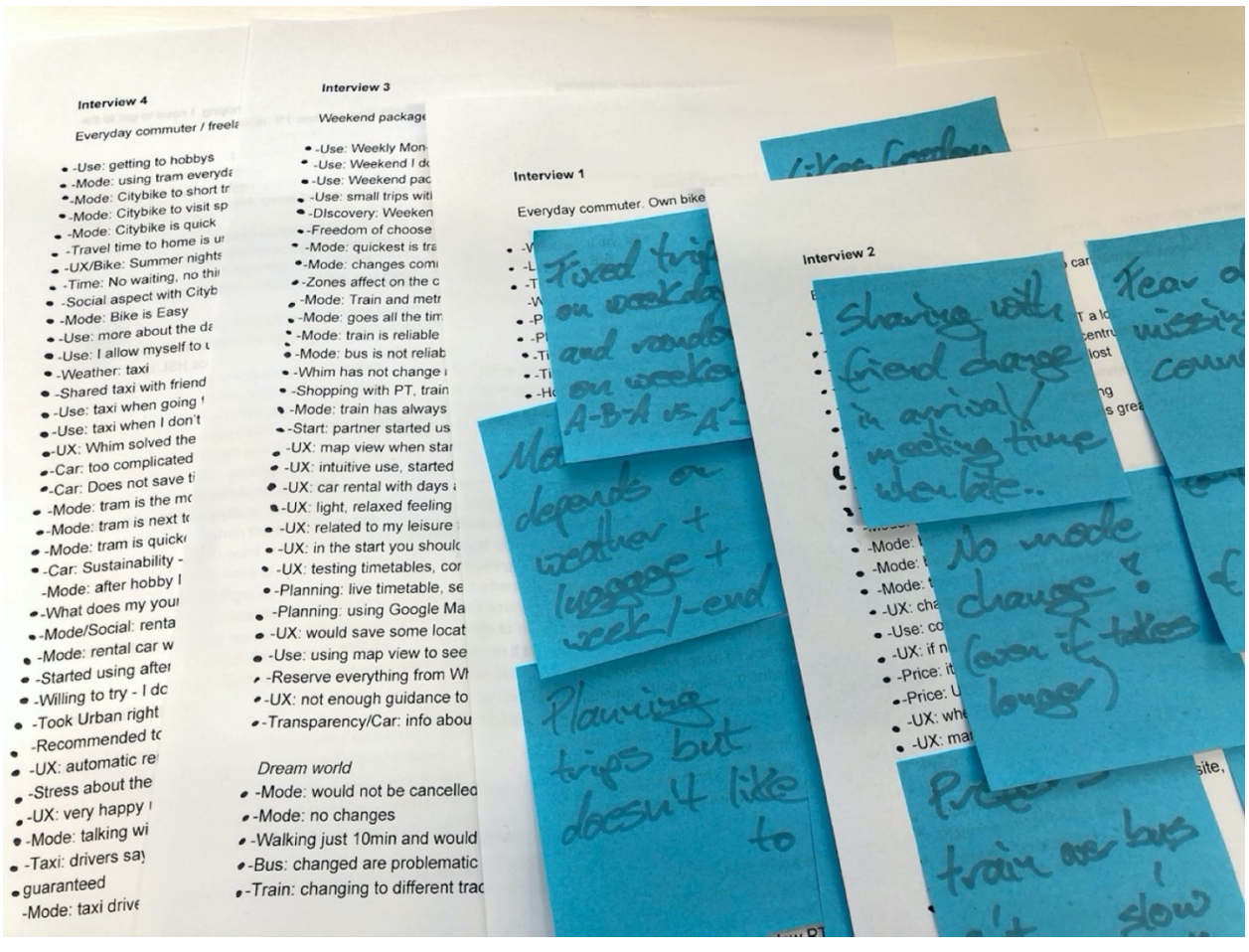

Figure 15. Member of business team made notes from the interview data.

After listening to the interviews and making breakdowns I used those transcripts to write Post-its out of them. I added the data to the wall in that way that every interview was its own segment (Figure 16). This was just to keep them aligned and maybe later to rearrange the data if needed.

Figure 16. Interviews on the wall.

Before moving the Post-Its for first segmentation we also wrote number to every one of them. This was to see if there were some big differences between how people use the service and thoughts they had. This number could also later be used as a cross-reference to individual interviews if needed.

For the affinity mapping itself there was a clear idea to have the MaaS Global design team making it together. Reasoning behind this was that the data from users is very important for everyone in the team and this way there is also more interpretations. I also wanted to have someone from business design side and asked Market Insights Manager to join the process. This was also because I wanted to share our customer insights to other teams. We had four people doing the clustering of data.

As there was a lot of Post-Its and lots of mobility related experiences and needs addresses, we only had time to make the clustering once (Figure 17). As said earlier it was clear that not all of the data was relevant.

Figure 17. First clustering with the team.

From this first clustering we found many interesting topics, some high level and some lower level issues. As usual some of the data could go to many places. From the clustering everyone commented that the most interesting things were related to the feelings and behavior. Topics like Routines, Enjoyment, Trust and Positives had many interesting observations.

But also, issues related to features of course are important and interesting as those are elements users might see in the UI level. Topics like Features or Bikes could have some low-hanging fruit with bigger user experience impact.

After this teamwork with first clustering of data I wanted to go deeper with the motivation as the main research question was “What is the motivation of using MaaS?”. For this work I wanted to loosely use Maslow's hierarchy of needs (Maslow 1954). In this second sorting of the data I added to the left topics: Enjoyment/Misery, Safety, Trust and Social (Figure 18). So, it was not only about negative things, as the data had both, but also about positive things. It was clear that we can use both to get new ideas and improvements for the service. I also used Post-Its from the ones we did not use in the first clustering.

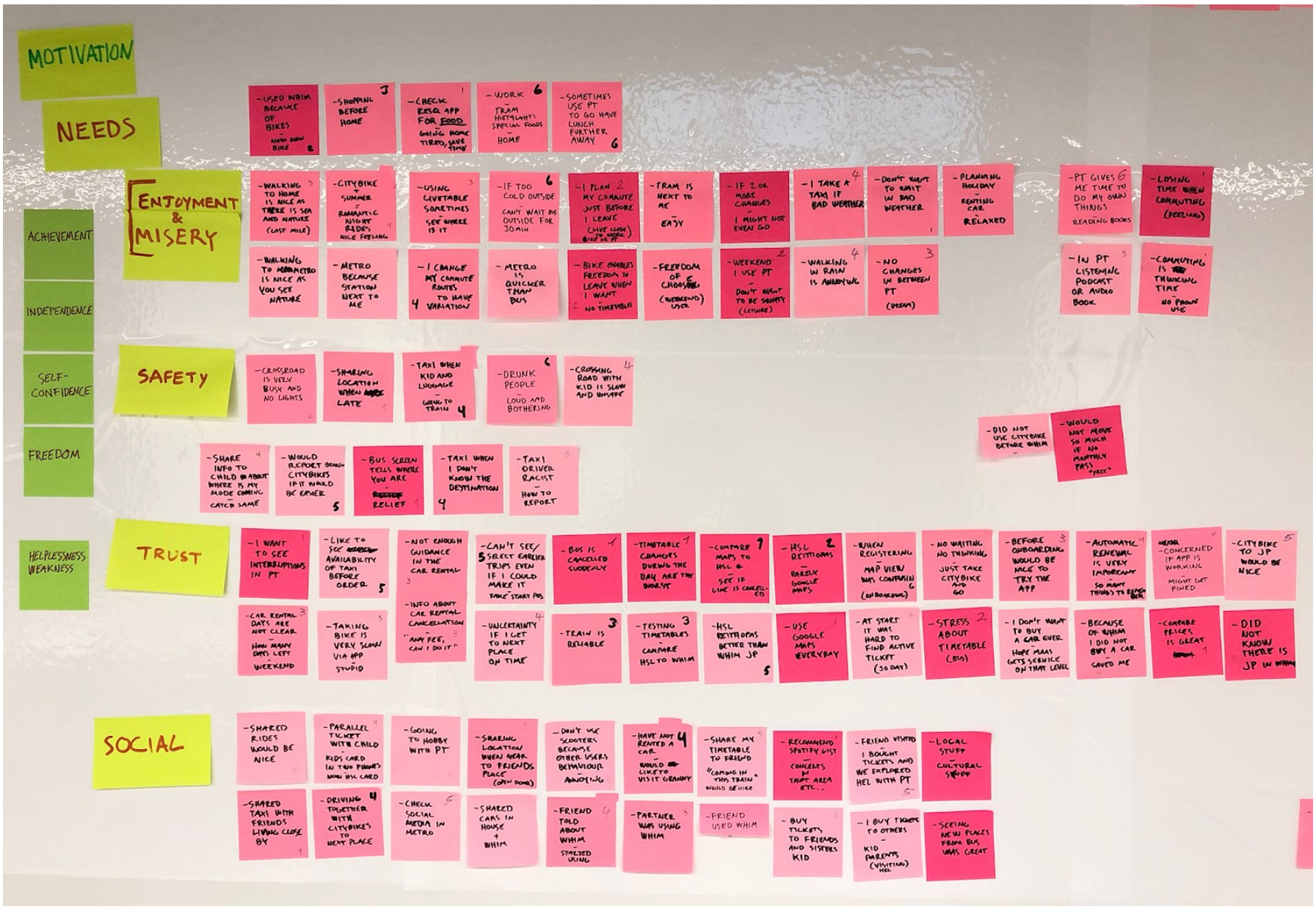

Figure 18. Clustering based on needs.

I also made third clustering (Figure 19) where I wanted to see how the good user experience principles are full filled. As an inspiration I used Peter Morville's user experience honeycomb (Morville, 2004). Again, the idea was to also add negative and positive things. Also, here I took some freedom when it comes to the segments. I named the segments as Value/Useful, Usability/Usable, Adaptability/Easy to start and Desirability/Fun and Engaging. These topics are important for user experience in phone applications. People nowadays don't want to have long learning curves or wait too long for something to happen (Ian Naylor, 2018). This has been also customer feedback from some features we have in the app. Simple example is that can you trust that your ticket is ready when the bus comes. But these things might also relate to slow APIs from the TSP side.

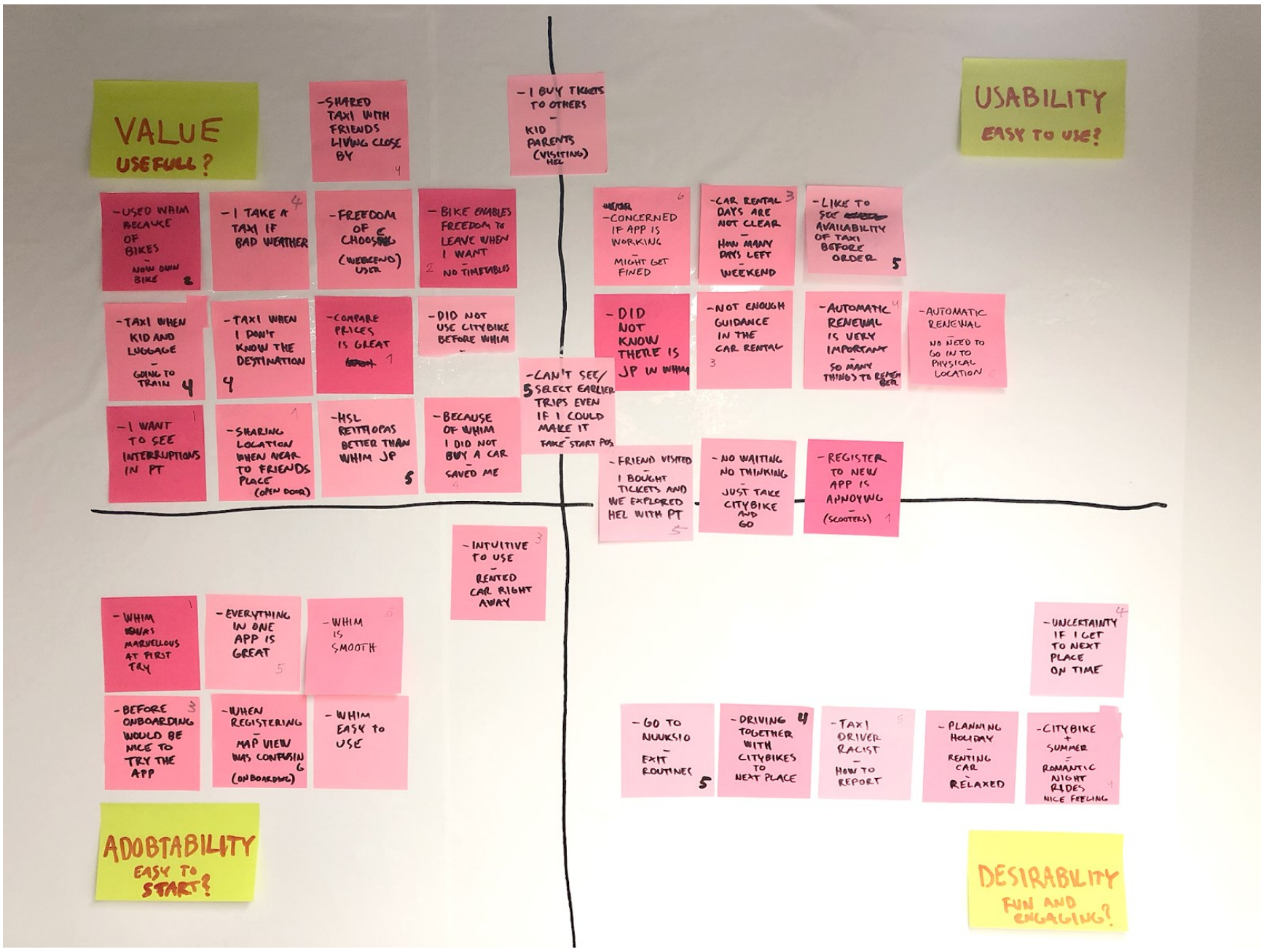

Figure 19. Third clustering.

4 Results and data insights

4.1 First clustering

From the first sorting of the data as a team we found 20 interesting segments. These segments were: Onboarding, Safety, Word to mouth, Cars, Competitors, Enjoyment, Commute, Trust, Taxi, Errands, Routines, Weather, Features, Sustainability, Positive, PT Pain points, Planning, Real time info, Bikes, Trains. Some of them were very high-level segments like Enjoyment and some related to very specific things like transportation mode. Like said earlier there were things we already know from previous research work. Some of the data was also very universal like people generally don't like to use the bus (Maghraoui, 2019). Also, some modes were preferred more than others.

Ideas around features found from the data suggested that users would want to see more mobility modes in the service. Users mentioned scooters, long distance busses, shared cars and even hotels. Some said they would like to see all the mobility related services in Whim. There was also a need for more flexible car rental. Some of the needs were related to information and how it is shown in the application. Users felt like it is not flexible enough and required too much effort from them. One of the interviewees hoped that the service would get even better so that she can keep living without owning a car.

One topic raised by everyone in the interviews was weather. Mostly it was negative aspects such as rain or cold. Interesting finding was that some of the users planned the whole next day based on the weather. This was not just personal bike users. Also, the weather affected the modes people choose. Taxi seemed to be a savior when the weather is very bad. But there were also positive things related to weather and time of the year. Citybike was always mentioned when talking about summer and good weather. Waiting times in cold weather or rain were pain points related to PT. Most of the users saw walking otherwise as a nice way of moving around if it is not raining.

It was not a surprise that there was a segment called PT Pain points. This was heavily related to bus but also to timetables. Most of the interviewees had experience that the busses are slow, they are not on time (late, not coming or going to early), there are too few lines and bus drivers are not nice. Other big pain point in the PT was changes between the trip to another bus or mode. This usually meant waiting, running, crossing big roads or missing the next line. Many also said that even that trains and metro are the favorite modes, there are times when they are too full. Related to this missing personal space was raised a few times. Intoxicated people at stations, dirty infrastructure was some smaller things some mentioned.

One very important part of commuting is planning the trip and real time info. These were different segments, but real time info is a subsection of journey planning. Even that there are users who don't need timetables all the time, everyone knows there can be exceptions in the lines. Related to this timetable changes, live data and cancellations were raised as key functionalities needed. One common topic was that everyone hated to use timetables were stressing about them. This is why micro mobility and local trains were ranked as best modes by many as those don't need planning in the same way as other modes. This is because the frequency is so often in Helsinki. There were also needs related planning when you have big luggage and child with you. Real time info was raised as users felt like the data is now very hard to find.

Behaviour related topics were errands, commute and routines. These are interesting topics as these are very much related to needs. Almost all of the interviewees were using PT to also get food in some form. This is not a surprise as it is also one of the biological needs (Maslow 1954). Most of them visited grocery shop before going home, few of them made an extra effort to visit shops with better or special selection. Some had such busy personal schedules that they wanted to see where to get food between going from A to B. There was also breakfast and waiting related shopping. Some used micro mobility to move around during the working day or visiting shops. Many had hobbies or social event where they went with PT. Most of them were doing something during the commute so that the time was not wasted like reading a book or doing work.

Safety had one interesting topic what repeated in many interviews. This was the need of sharing your location to others. Some used as a convenience and some related to safety. There was also one wish that this kind of "share my route to friend" would be a nice feature in Whim.

Onboarding to the service was raised also in many of the interviews in some level. People felt the registration was confusing. Also, some of them felt like it would be nice to first test the app before giving all the information about them self. This was also backed up with interview data where people first tested the app with single trips before taking a subscription. From the feedback it was also clear users would like to use new things like shared cars and scooters inside Whim as they did not want to register to new services. Some said this was the only reason why they don't even use those services now.

One concerning topic was trust. This was mostly related to timetables and journey planning. One user was comparing times in Whim and HSL. Some were concerned that they were not sure if the application works all the time. Also, bus drivers were mad if users did not have the ticket ready right away.

There was also a segment called positives where people raised topics like automatic renewal, all in one app and easy to use. This segment also had topics related to social aspects such as buying a ticket to your friend or child. There was also wishes to see even more services in Whim as they were so happy using it. Some behavior changes were also mentioned. One Weekend subscription package user, includes a car for weekend, started exploring Finland and made small trips every weekend. This meant she did not make any trips abroad this summer.
All of the modes had some input from the interviewees. Rental cars had feedback related to the terms and conditions. This is also a trust related issue. Users said it was not clear how it works. Examples of such are cancelling the reservation and overall guidance on how to do it. Taxi was seen overall as very positive savior of the day. Related to taxi there was also some wished like shared taxi. It was also seen as more ecological way of moving than owning a private car. Taxi also had user experience related things like seeing estimate arrival time before ordering. Taxi was also used when the destination was not familiar. Bike, in this case Citybike, was seen as carefree option, just take it without planning.' To some It was also

social way of moving around together. Train and metro were the kings of mobility. It was very liked because of the speed and no need for timetables. Both were also seen as very reliable and easy to use.

4.2 Second clustering

Second clustering of data was made individually (Figure 18). As said earlier I wanted to go deeper into the motivations. This why I used Maslow's Hierarchy of Needs (Maslow 1954) as a base for the segments.

On the top level there was basic need related to food. All of the interviewees said they visit shops to get groceries, coffee or snacks between or after the commute. This was related to being in a hurry, making it more convenient or just being very tired. One user also visited lunch places further away.

Then there was enjoyment and misery related topics. People said that it is nice to walk home next to the nature and using Citybike for romantic summer night rides. Some also said Citybikes enable freedom. Same kind of feeling was raised related to the Weekend subscription. One of them also changed the routes of commute so that it would not be so boring. Weather was also related to this as there was too cold to wait outside or it was raining so cannot use bike. Some said that if there is more than one change she might not even go. Changes were raised many times as being very annoying. Some felt commuting was me time, time to think, read and work. Planning when to rent a car for a holiday trip made one user feel the whole app is relaxed. This made her want to try more things inside the service.

Safety was not raised that much in the interviews. It is good to remember this is very culture and location related topic. There was still the need for sharing a location to a friend or child. Some said seeing the bus stops from bus screen was helping with the trust related to bus. One user wanted to report drivers if they see they are not behaving like expected. Taxi was also used to get around if it was an unfamiliar destination or totally new city. Reporting broken Citybikes was seen as a very difficult process and would be nice to have as part of the Whim application. Crossing roads was a topic raised by many.

Trust related topics had a lot of input from the interviews. Most of them were related to the fact that users used some other app than Whim to see timetables. All of them used some other app for that info. All of the participants had a bad experience with timetables, not just in Whim but overall. There was a lot of uncertainty, waiting and overall stress. Two of the users did not know there is a journey planner inside Whim. Product is easy to use when the set of possible actions is visible. As said earlier car rental had some issues with clear instructions and terms of use. One had positive experiences that she did not buy a car because of Whim. Automatic renewal of the monthly subscription was seen as one of the best features as there is no need to remember to renew or keep physical card with you.

Then there were many social aspects of mobility. This field has not been studied that much. Few of the said that shared cars would be great. Also shared taxis were seen as a good thing. Citybikes were used to move around with friends. Sharing location or timetable to a friend to let them know where and when you arrive was raised in a few of the interviews. This was social and not safety related. Local stuff and music (Spotify list) were also mentioned as features related to your location. Some wanted to rent a car for a few days to visit relatives or friends but have not tried yet. There was also use cases where interviewees bought tickets to their friends or relatives when they came to visit Helsinki. Some of the used PT to see the city and different attractions. Many started also using the service because of a friend or partner was using the Whim.

4.3 Third clustering

Last sorting of the data was tightly related to user experience. User experience and brand image are heavily related to each other. As applications and even more services are not very tangible like physical items you can touch, it is very important to build the brand image via solid user experience. This is built with deep understanding of users' needs and abilities. Also knowing the limitations of the systems used, designer can even out the bad experience with good design. Last sorting of

data had four segments based on Peter Morville's user experience honeycomb. The topics he uses are: Useful, Usable, Desirable, Findable, Accessible and Credible. Basically, these topics address things like does it fulfill the need, is it easy to use, does the design raise emotions, is it easy to find the things you need, is it accessible and can users trust the product (Usability.gov). Like said earlier I used only some of them for this clustering, but it is clear the data address most of them. Some are positive things and some point to fix.

Inside the Whim application there is a service offering for monthly users where 5km trip costs fixed 10€. Participants saw value in taxi at many levels. It can take you quickly to the next place or you can use it in unfamiliar places. Comparing prices in one place was seen very useful. One participant has not bought a car because of the convenience of taxi. There was a comment about the need for function to report a driver.

From the other side there were comments that because of own bike there was no need for Whim anymore. Also, the comments about using second application for timetables was mentioned by many. Also not seeing earlier timetables were seen as a usability thing.

Also, the social aspect was pointed out. Participants bought tickets from Whim to others making trip together easier. Something missing now is sharing the location or trip to others. Citybikes were described as being easy and giving a feeling of freedom. Citybikes also had a social aspect and were used to drive together. I would say that from the interviews Citybikes were seen the most desirable service in the Whim application.

Automatic renewal of PT monthly ticket was seen one of the most important features. It was easy and there was no need to remember the date. There is also the convenience of not having a physical card or fill it in some locations.

As there were comments that some participants had a concern if Whim is working all the time, it is clear that there is or has been some usability problems. Usability concern was also that some of the participants did not even know there is a journey planner in the Whim application.

Rental car had few comments related to the transparency of rules and how the process of renting a car works. Like how to cancel a booking and does it cost something.

Most of the interviewees commented that Whim was easy to start and intuitive to use. Everything in one app was seen as a great benefit. Many said they don't want to register to new applications, and this has prevented them using for example shared cars. There was also comments that the onboarding is little bit confusing with the map view. Also, some said it would be nice to first try the app before giving all the information.

5 Conclusions

5.1 Reflecting to the findings

One big topic all of the interviews had common were the problems, bad experiences and negative feelings related to timetables.
Linked to this was also the fact that our users had trust issues and some usability problems with Whim applications timetables and journey planner. This topic has been known inside the company, but it was a surprise that all of the interviewees talk about the fact that they use other apps to see timetables. So, there is scope for improvement that people need to have two apps for their daily commute. Whim journey planner is also now missing the function of showing interruptions and changes in timetables. This was raised by a few of the participants in the interviews. When it comes to feeling freedom and not getting worried this function is a crucial part of that. It is also building the trust to the service in that way that user feels that we get you there.

Behavior change is a gradual process and it will take some time to change people's behavior and even harder as there are very well-established brands out there that people use habitually. So, when thinking about how to align Whim application, it is very hard to compete with companies like Google or Apple as they have years of experience and so much data behind them. I see that the journey planner in Whim should evolve towards the needs of commuters. From the interviews the need for real time info was raised many times. Also need for more personalized experience was clearly an opportunity for us. Combining live data and ability to modify the app use based on your needs would be something new. Commuters want to focus on their daily routines. This also means using the same route and mode every day. If you can free them from timetables but still give fresh info seemingly, like interruptions on those lines, it would make the experience of commuting more relaxed. No more running to the bus as we make sure you are on time. We cannot fix the bus lines or weather but at least users would know what the situation is right now or 10min later.

I see a lot of opportunities in the sharing your location or route. This is related to the topic of social behavior. It can also be linked to safety. Both being important user experience factors. Sharing route could also work for other ideas, even for business side. It could be linked to the other needs people raised in the interviews. There were also many social aspects in the usage of Whim. People bought tickets to others and used bikes for biking together. The bikes also had feelings of enjoyment and freedom. Something the car users always point out.

5.2 Limitations

There were some limitations in the process. One critical one, also to keep in mind for future, was that there was not so many critical participants now included. As the recruitment of people critical towards the service is harder, some of them have dropped from the service, most of the interviewees were very positive. One aspect is that all of the interviewees were heavy PT users. Therefore, understanding motivations for car users is missed out from this research.

Also, the fact was that I was working full time when making this thesis. The focus and motivation were lacking many days. I had only one official day of doing the thesis weekly. Otherwise the time was taken from my free time after work.

6 Outcomes

6.1 Learnings

First thing would be the fact that one should never think recruiting the interviewees will be quick and easy. This was the thing I was warned about but as we had Facebook group with friendly users, I did not think about it too much. I was lucky to get a diverse group of people for interviews and executed my plan from that part.

From this process I learned more about the basic skill that every designer needs in their work: asking from the users. More detailed the process of interviews. As it was the first time I conducted interviews by myself, it meant that I had to think about what are the things I need to find out, how to ask them and how to handle the whole process from planning to documentation (Gjoko, Muratovski, 2016). When I got my interview questions done, I was very confident about the plan I had.

It was clear after the first interview that I was too much in my comfort zone when interviewing my friend. After the interview I felt almost totally lost with my process as it seemed that there was not that much data and it felt not so interesting. At this point I talked with my supervisor and advisors about this. After these talks, I read some of the basic service design techniques. One mistake I did in the first interview was that almost every time I was happy with the first answer. After this I started asking more why, how and what. After this self-critic moment and reading more I improved the interview process every time. Overall, I also got the participant to talk more and hit the target of them talking 80% of the time like Sarvas, Nevanlinna and Pesonen (2017) suggested. (Sarvas, Nevanlinna, Pesonen, 2017). I would say doing interviews is not like

riding a bike, it is more like the Counter-Strike game: if you don't practice it, you will get rusty and don't hit the target. As I am not an extrovert person, I feel strange that I still can manage user interviews. Maybe it is all about the role you take. And because of that I would not be able to do user interviews as daily basis.

Biggest thing I will take from this process is the fact that designers can often forget the users when they have to design complex products or services and when there is a constant hurry to meet deadlines. It is very common, but it is still an excuse and will backfire in the long run. User research should be part of every new product or flow, even if it is small user testing inside the company, it will make a difference.

6.2 Next steps

Whim application is now around two years old and the process of designing new user experience and brand has started. After this research work the design team has a better idea of the user experience now and can even set new experience goals (Lu, Roto, 2014). The data found in this process confirms some of the issues that the team was already familiar with, whereas some were new insights. There are clear opportunities in the data like the live information for public transport users. Going towards to be more application for commuters is something the team needs to investigate more. There are also things that needs to be fixed like the journey planner experience. Like Don Norman says these are signifiers of the topics where people have problems and give clear signs where the service can be improved (Don Norman, 2013). This topic was already a known thing inside the team. As these topics are linked, they need to be looked in a bigger picture.

The social aspect of mobility has a lot of potential for our team. Like using bikes together or buying tickets to others. This topic needs further research work. It would be also good to have few workshops with the users. First to gather some ideas and second to test the concepts. From the data it was also clear that word to mouth is the best marketing tool you can get. Almost all of the interviewees started using Whim application after they heart from it from their friends. Some reference models inside the Whim have been tried already. Linking the social aspect and referring could have lot of potential when it comes to getting new users for the service. Maybe discounts from public transport tickets for user who bike together and have some coffee.

Getting more users is also related to the business side. Like Don Norman points out it does not matter how wonderful the product is if not enough people buy it (Don Norman, 2013). This also comes back to the fact that if the service does not get users to recommend it to others, it will lose lots of new potential users. But to get people to recommend it the user experience need to be really good. It is more common to share the bad experiences.

The second thing was a little bit of surprise and not expected. It was the user journey tool and process how to study what kind of things people experience during their different stages of mobility. This tool and process still needs development, but it was very promising. Inside the design team we had many talks about the next steps and things I experienced with the process. There is an idea to make it to tool kit where we would have the user journey template alongside the mobility cards. Also, it was clear that users need to have the possibility to make new cards on the fly. This was now done using Post-It's. These can be replaced maybe with empty cards. Of course, the idea is also to add new cards to the deck when people contribute new things. In this way the empty cards with writing would be replaced with printed version at some point. As there is already a lot of cards users started to have problems finding the card they needed. So, there was a talk to group them and use a color code. Groups could for example include feelings, modes and places. Making these categories would also make it easier for the participants to understand what is happening.

One big potential inside the company would be to add this process to the product development pipeline. In that way it would always have enough time for execution and would include users to the process. As said this process can also have different kinds of goals depending on is it known market/product or totally new phenomena. It could even be used inside the company to share insight from users. It can also be used to interface with TSPs and develop a common understanding of the intended experience.

After the thesis process is done, I will also share the key insights for the whole company. For this part I can also use the user journey pictures from every interview. It makes the topic more interesting as you can see visual differences. This is an important part of this work to also get more visibility for the design work inside the company. It will also get others to empathize what do the users experience (Kalbach, 2018).

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Images
All photographs are taken by the author.

Appendix

Interview questions

1. Hi, could you introduce yourself? What do you do for work? Hei, voisitko esitellä itsesi?
2. How do you generally move around?

   2.2 Does your mobility change when comparing weekly and weekend usage?

   2.3 Has your mobility changes in near history?
3. What mode of transport do you prefer?

   3.2 What modes would you like to use? What is preventing?
4. Could you describe your monthly mobility?

   4.2 Ask about modes and if there is other usage than commuting
5.

Question about Whim:

6. How did you make a decision to start using Whim?
   6.2 Do you remember the first time using it?
7. What has been the best thing when it comes to using Whim?
   7.2 What features do you like or dislike the most?
8. Do you use other apps related to mobility?
   8.2 Do you use journey planners?
9. As it is a subscription based service - What in your mind is still missing from it?
10. If you would recommend Whim to your friend, what would you say or raise up?
11. Let’s imagine perfect World, what kind of things would you like to have in your day to day commute?
    What would you change in that?